

What is claimed is:

1. A positive electrode active material consisting essentially of a metal oxide powder for use in a nonaqueous electrolyte secondary battery, comprising:

5 1 vol.% or less of a coarse particle having a particle diameter of 600% or more relative to an average particle diameter of the metal oxide powder; and

10 1000 ppm or less by mass of a high density particle having a density of 150% or more relative to an average density of the metal oxide powder.

2. The positive electrode active material as set forth in claim 1:

15 wherein the coarse particle is at least one particle selected from an agglomeration of the positive electrode active material, a combination of the positive electrode active material and other material, and a impurity particle, and the high density particle is a powdery metallic impurity.

3. (Amended) The positive electrode active material as set forth in claim 1:

20 wherein a content of the coarse particle, of which the particle diameter is 400% or more relative to the average particle diameter of the metal oxide powder, is 1 vol.% or less, and a content of the high density particle, of which the density is 150% or more relative to the average density of the metal oxide powder, 25 is 100 ppm or less by mass.

4. (Amended) The positive electrode active material as set forth in claim 1, further comprising:

1 vol.% or less of a fine particle having a particle diameter

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of 15% or less relative to the average particle diameter of the metal oxide powder; and

1000 ppm or less by mass of a low density particle having a density of 50% or less relative to the average density of the 5 metal oxide powder.

5. The positive electrode active material as set forth in claim 1:

wherein the positive electrode active material is made of a composite metal oxide including lithium and at least one element 10 selected from cobalt, nickel and manganese.

6. The positive electrode active material as set forth in claim 5:

wherein amounts of impurity elements in the positive electrode active material are 200 ppm or less for iron, 50 ppm 15 or less for copper, 30 ppm or less for zinc, 400 ppm or less for nickel, and 40 ppm or less for manganese.

7. A positive electrode active material consisting essentially of a metal oxide powder for use in a nonaqueous electrolyte secondary battery, comprising:

20 1 vol.% or less of a coarse particle having a particle diameter of 30  $\mu\text{m}$  or more; and

1000 ppm or less by mass of a high density particle having a density of 7  $\text{g}/\text{cm}^3$  or more.

8. The positive electrode active material as set forth in 25 claim 7, further comprising:

1 vol.% or less of a fine particle having a particle diameter of 0.5  $\mu\text{m}$  or less; and

1000 ppm or less by mass of a low density particle having

a density of 2.5 g/cm<sup>3</sup> or less.

9. (Amended) A method of manufacturing a positive electrode active material for a secondary battery, comprising:

manufacturing a powdery positive electrode active material

5 by mixing raw material powders of the positive electrode active material for a secondary battery with a desired ratio and firing the mixture; and

separating and removing simultaneously a coarse particle and a high density particle from the powdery positive electrode

10 active material, by making use of difference of resistance force based on a diameter or a density of particle constituting the powdery positive electrode active material, so that the coarse particle having a particle diameter of 250% or more relative to an average particle diameter of the powdery positive electrode

15 active material, and the high density particle having a density of 120% or more relative to an average density of the powdery positive electrode active material are removed from the powdery positive electrode active material.

10. (deleted)

20 11. The method of manufacturing a positive electrode active material for a secondary battery as set forth in claim 9:

wherein the coarse particle made of at least one particle selected from an agglomeration of the positive electrode active material, a combination of the positive electrode active material

25 and other material, and a impurity particle, and the high density particle made of a powdery metallic impurity are simultaneously removed from the powdery positive electrode active material in the separating and removing process.

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12. The method of manufacturing a positive electrode active material for a secondary battery as set forth in claim 9: wherein the process for separating and removing the coarse particle and the high density particle is implemented by use of 5 a classifier.

13. The method of manufacturing a positive electrode active material for a secondary battery as set forth in claim 9: wherein the separating and removing process is implemented so that a fine particle having a particle diameter of 50% or less 10 relative to an average particle diameter of the powdery positive electrode active material, and a low density particle having a density of 75% or less relative to an average density of the powdery positive electrode active material are simultaneously removed.

14. A nonaqueous electrolyte secondary battery, 15 comprising:

a positive electrode comprising a positive electrode active material consisting essentially of a Li containing composite metal oxide powder, the positive electrode active material comprising 1 vol.% or less of a coarse particle having a particle 20 diameter of 600% or more relative to an average particle diameter of the composite metal oxide powder, and 1000 ppm or less by mass of a high density particle having a density of 150% or more relative to an average density of the composite metal oxide powder;

a negative electrode disposed so as to face the positive 25 electrode through a separator;

a battery case for accommodating the positive electrode, the separator and the negative electrode; and

a nonaqueous electrolyte filled in the battery case.

15. A nonaqueous electrolyte secondary battery,  
comprising:

a positive electrode comprising a positive electrode active material consisting essentially of a Li containing composite metal oxide powder, the positive electrode active material comprising 1 vol.% or less of a coarse particle having a particle diameter of 30  $\mu\text{m}$  or more, and 1000 ppm or less by mass of a high density particle having a density of 7  $\text{g}/\text{cm}^3$  or more;

5 a negative electrode disposed so as to face the positive electrode through a separator;

10 a battery case for accommodating the positive electrode, the separator and the negative electrode; and

a nonaqueous electrolyte filled in the battery case.

16. A reproduced electronic functional material powder recovered and reproduced from a waste electronic component or a waste material produced in the course of manufacturing an electronic component, comprising:

15 1 vol.% or less of a coarse particle having a particle diameter of 600% or more relative to an average particle diameter of the powder; and

20 1000 ppm or less by mass of a high density particle having a density of 150% or more relative to an average density of the powder.

17. The reproduced electronic functional material powder as set forth in claim 16, further comprising:

25 1 vol.% or less of a fine particle having a particle diameter of 15% or less relative to the average particle diameter of the powder; and

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1000 ppm or less by mass of a low density particle having a density of 50% or less relative to the average density of the powder.

18. A reproduced electronic functional material powder  
5 recovered and reproduced from a waste electronic component or a waste material produced in the course of manufacturing an electronic component, comprising:

10 1 vol.% or less of a fine particle having a particle diameter of 15% or less relative to an average particle diameter of the powder; and

1000 ppm or less by mass of a low density particle having a density of 50% or less relative to an average density of the powder.

19. The reproduced electronic functional material as set  
15 forth in claim 16:

wherein the reproduced electronic functional material is a reproduced positive electrode active material or a reproduced phosphor.

20. (Amended) A method for reproducing an electronic functional material, comprising:

recovering an electronic functional material from a waste electronic component or a waste material produced in the course of manufacturing electronic component; and

25 reproducing an electronic functional material powder by refining the recovered electronic functional material;

wherein, in the refining the recovered electronic functional material, by making use of difference of resistance force based on a diameter or a density of particle constituting

the electronic functional material powder, simultaneously separating and removing a coarse particle and a high density particle from the electronic functional material powder, so that the coarse particle having a particle diameter of 250% or more relative to an average particle diameter of the electronic functional material powder, and the high density particle having a density of 120% or more relative to an average density of the electronic functional material powder are simultaneously removed.

10        21. (deleted)

22. The method for reproducing an electronic functional material as set forth in claim 20:

      wherein the coarse particle made of at least one particle selected from an agglomeration of the electronic functional material, a combination of the electronic functional material and other material, and a impurity particle, and the high density particle made of a powdery metallic impurity are simultaneously removed from the electronic functional material powder in the separating and removing process.

20        23. (Amended) The method for reproducing an electronic functional material as set forth in claim 20:

      wherein the separating and removing the coarse particle and the high density particle is implemented by use of a classifier.

25        24. The method for reproducing an electronic functional material as set forth in claim 20:

      wherein the separating and removing process is performed so that a fine particle having a particle diameter of 50% or less relative to the average particle diameter of the electronic

functional material powder, and a low density particle having a density of 75% or less relative to the average density of the electronic functional material powder are simultaneously removed.

5        25. The method for reproducing an electronic functional material as set forth in claim 20, comprising:

recovering a positive electrode active material from a waste secondary battery or a waste electrode produced in the course of manufacturing secondary battery; and

10        reproducing a positive electrode active material powder by refining the recovered positive electrode active material.

26. The method for reproducing an electronic functional material as set forth in claim 20, comprising:

recovering a phosphor from a waste electron tube or a excess phosphor slurry produced in the course of manufacturing electron tube; and

reproducing a phosphor powder by refining the recovered phosphor.

27. (Amended) A method for reproducing an electronic functional material, comprising:

recovering an electronic functional material from a waste electronic component or a waste material produced in the course of manufacturing an electronic component; and

reproducing an electronic functional material powder by refining the recovered electronic functional material;

wherein, in the refining the recovered electronic functional material, by making use of difference of resistance force based on a diameter or a density of particle constituting

the electronic functional material powder, the process for simultaneously separating and removing a fine particle and a low density particle from the electronic functional material powder is implemented so that the fine particle having a particle 5 diameter of 50% or less relative to an average particle diameter of the electronic functional material powder, and the low density particle having a density of 75% or less relative to an average density of the electronic functional material powder are simultaneously removed.

10 28. (deleted)

29. The method for reproducing an electronic functional material as set forth in claim 27:

wherein the process for separating and removing the fine particle and the low density particle is implemented by use of 15 a classifier.

30. (Added) The method of manufacturing a positive electrode active material for a secondary battery as set forth in claim 12:

wherein the simultaneously separating and removing the 20 coarse particle and the high density particle is implemented by use of a centrifugal classifier, which has a classification rotor that classifies by making use of a balance between centrifugal force due to forced vortex and fluid resistance, and by adjusting the number of revolutions and an amount of airflow of the 25 classification rotor.

31. (Added) The nonaqueous electrolyte secondary battery as set forth in claim 14:

wherein the secondary battery is used for a portable

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electronic device.

32. (Added) The nonaqueous electrolyte secondary battery as set forth in claim 15:

wherein the secondary battery is used for a portable  
5 electronic device.

33. (Added) A portable electronic device, comprising:  
a nonaqueous electrolyte secondary battery set forth in  
claim 14 as a power source.

34. (Added) A portable electronic device, comprising:  
10 a nonaqueous electrolyte secondary battery set forth in  
claim 15 as a power source.